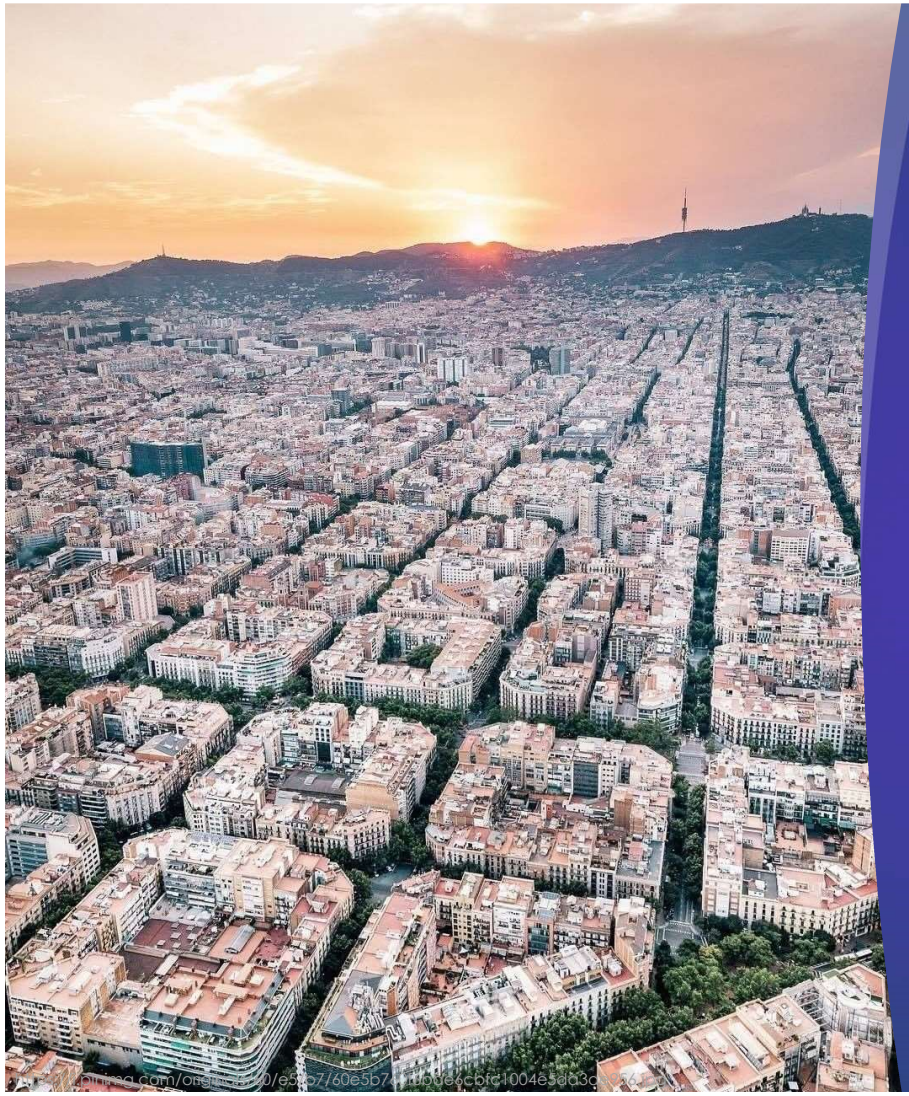


Sustainable Mobility Reframed: Policy Implications Using Activity Fragmentation Indicators of individual mobility sequences in Barcelona

Lucia Mejia Dorantes, Ph.D. - Consultant

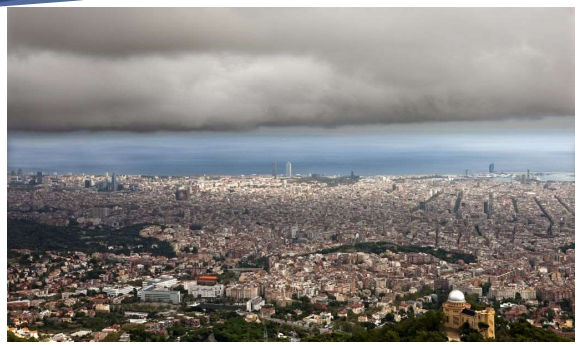
THIS RESEARCH PROJECT IS A COLLABORATION WITH DR. LIDIA MONTERO AND PROF. JAUME BARCELO (UPC)

Introduction

- Citizens take part in different activities to:
  - Satisfy their needs
  - Participate in social, health, educational, economic activities
  - Invest in their socio-economic progress
  - Community participation
  - Improve their well being
- Activity participation is also influenced, among other things, by many factors in the **built environment** and by **individual attributes.**

Suburbanisation challenges

- **The rise of the 15-minutes cities:** Important disparities in service provision, land-use planning, and transport alternatives among neighbourhoods (Ferrer-Ortiz et al., 2022).
- Several authors highlight that **poverty** is moving out of the city centre and "**decentralising**" to the outskirts, not only as a result of increasing population, but also as:
  - a consequence of income inequalities,
  - lack of social housing combined with market-oriented housing policies,
  - gentrification and urban segregation (Cooper and Kurzer, 2023; Kadi and Matznetter, 2022; Loomans, 2023).
- **Car-oriented neighbourhoods pose different challenges** in terms of higher commuter costs, (involuntary) immobility, pollution, accidentality, and lack of social interaction, car dependency, mobility and time poverty
- **Overtouristic destinations:** Overtourism affects quality of living in cities and pose new challenges.

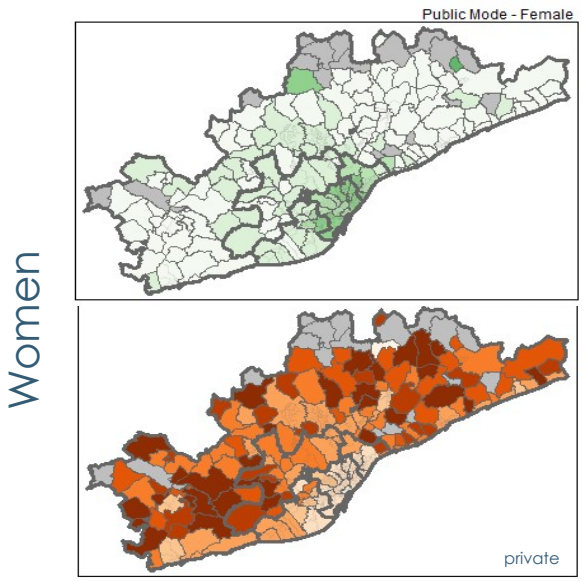


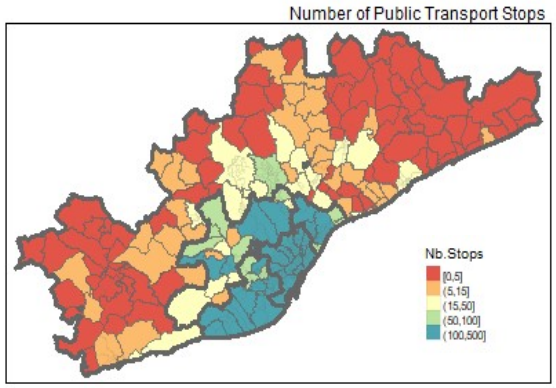
https://www.barcelona.cat/barcelona-pel-clima/en/climate-change-barcelona/our-activity-affects-climate

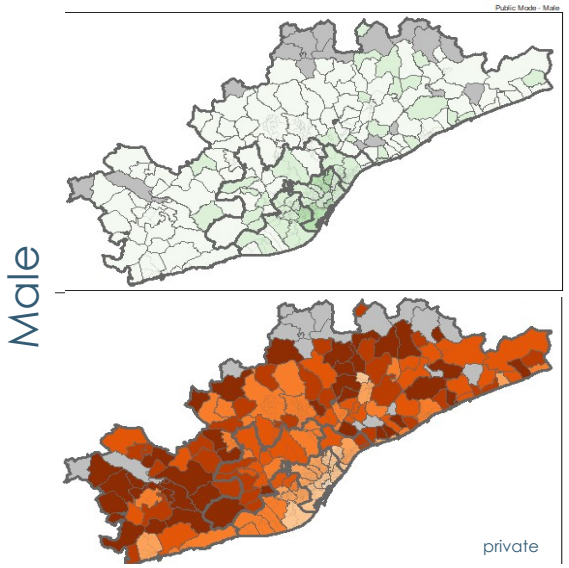
https://www.telegraph.co.uk/travel/destinations/europe/spain/catalonia/barcelona/articles/barcelona-unveils-new-law-to-keep-tourists-away/

Objectives

- To gain a better understanding of the spatiotemporal patterns and travel behaviour in the metropolitan area of Barcelona (RMB). Pre- and post-pandemic and according to different population groups.
- To measure fragmentation in a Transport Oriented Development (TOD) area based on sequence analysis using consecutive mobility surveys (2018-2021) together with other information sources.
- To analyse gendered mobility patterns and discuss which characteristics play a significant role in shaping mobility.







Summary of results

Gendered mobility:

- Women: More sustainable trips, i.e. Walking , PuT (over any trip purpose & OD subarea/crowns),
- Men: higher micromobility share, more likely to use Private transport (automobile)
- Gender equality & the complexity of daily schedules. We start with similar values of fragmentation indicators (16-29 years) between female and male groups, but…
- The percentage of private transport use is severely affected by residential area (analysed here as crowns), showing that in non-central crowns there is an increase of private transport activity compared to Barcelona city; whereas public transport in the central crown as higher Barcelona city than in the external crowns. Similarly, active modes are preferred in the central part of Barcelona city.

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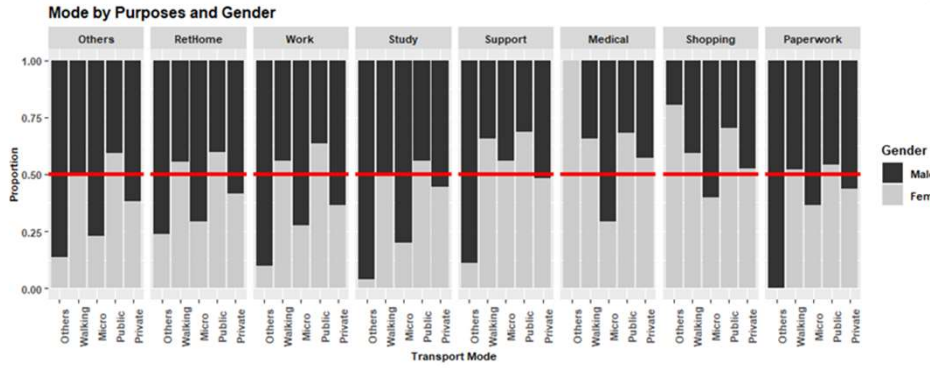
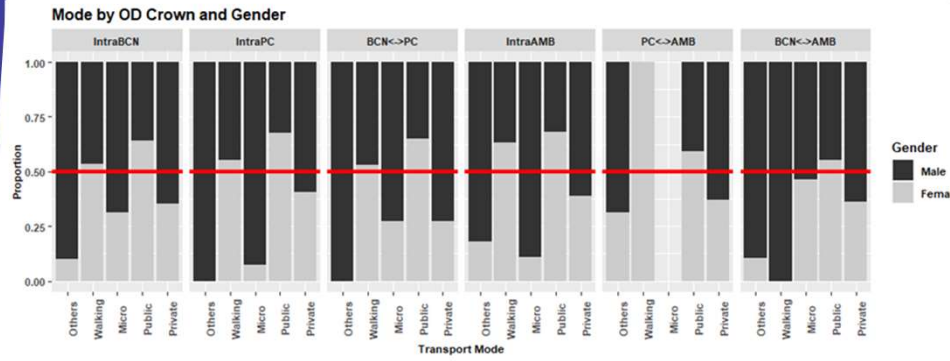
- Modal preferences 2020: related to frequent walking, cycling, or using car as a non-driver.





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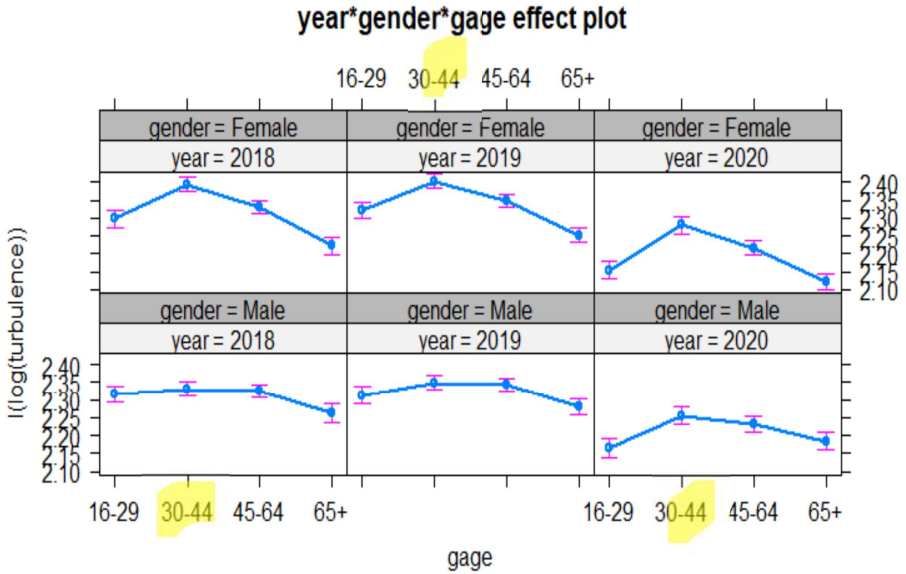

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Gender	Activity States and Transition Modes									
	A Escort.	C Casual	H Home	O Other	S School	TC Private Tr.	TM Other Tr.mode	TP Public Tr.	TW Active modes	W Work
Male	1.0%	1.9%	62.6%	4.9%	2.5%	3.0%	0.2%	1.4%	2.2%	20.2%
Female	1.3%	2.3%	68.1%	4.6%	2.4%	2.0%	0.1%	1.8%	2.2%	15.2%

Age group	Activity States and Transition Modes									
	A	C	H	O	S	TC	TM	TP	TW	W
16-29	0.3%	2.3%	60.1%	5.4%	12.2%	1.9%	0.1%	3.2%	1.6%	12.9%
30-44	1.7%	1.6%	58.2%	3.8%	0.6%	3.2%	0.2%	1.5%	1.9%	27.4%
45-64	1.1%	2.0%	62.8%	4.4%	0.3%	2.9%	0.1%	1.4%	2.1%	22.9%
65+	1.2%	2.9%	82.9%	6.1%	0.2%	1.4%	0.1%	0.9%	3.5%	0.9%

Year	Activity States and Transition Modes									
	A	C	H	O	S	TC	TM	TP	TW	W
2018	1.0%	2.7%	61.7%	5.1%	2.8%	2.9%	0.0%	2.0%	2.1%	19.6%
2019	1.5%	2.1%	60.8%	5.9%	3.0%	2.8%	0.1%	1.9%	2.4%	19.5%
2020	0.9%	1.6%	73.5%	3.5%	1.5%	1.8%	0.2%	0.9%	2.2%	13.8%

Crown	Activity States and Transition Modes									
	A	C	H	O	S	TC	TM	TP	TW	W
BCN	1.2%	2.7%	61.9%	5.8%	2.8%	1.5%	0.1%	2.8%	2.9%	18.4%
PRIMARY	1.4%	2.4%	63.8%	4.6%	2.5%	2.2%	0.1%	2.0%	2.5%	18.4%
AMB	1.3%	2.0%	63.3%	4.5%	2.8%	3.1%	0.1%	1.4%	2.2%	19.1%

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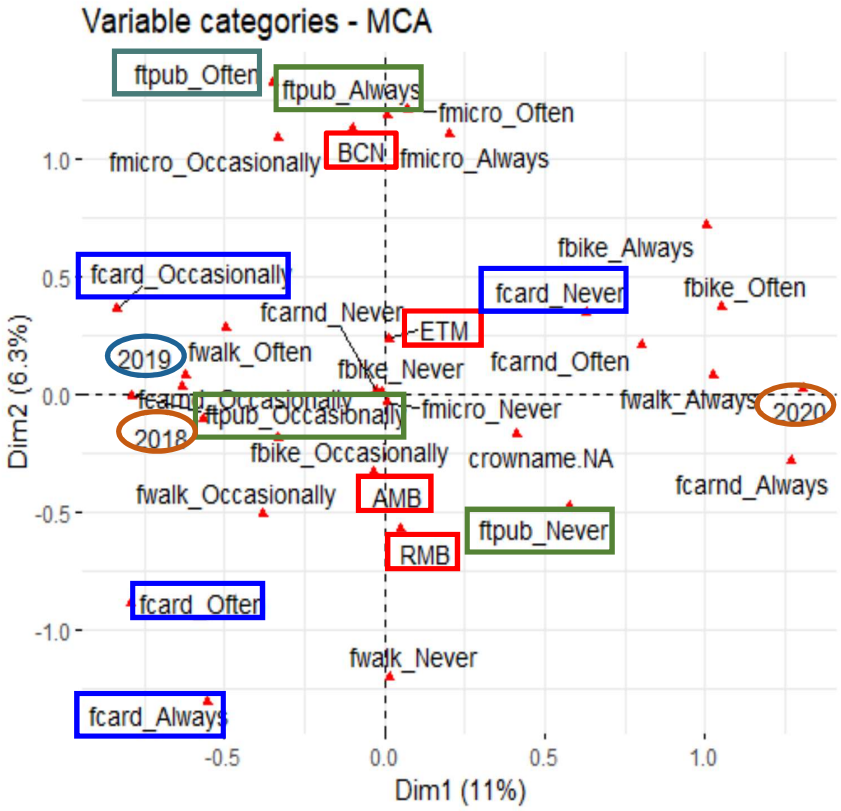

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But it is not only about gender:

- In comparison to 2019, in 2020 (October) lower income people (in most cases employed in frontline jobs, did not diminish their trip rate between 2019 and 2020. People with higher wages, were the ones that diminished the most their number of trips
- Activity variety depends on gender and educational level. Female individuals with lower education level present a lower level of activity variability than men, whereas the gap tends to be inexistent when analysing individuals with higher education.
- Female individuals have higher probability of being immobile, remarkably women older than 65 years. However, immobility decreases by gender as education increases.
- →Limited information: we cannot evaluate sustainable mobility patterns, willingness to stay at home (working from home arrangements) and undesired immobility

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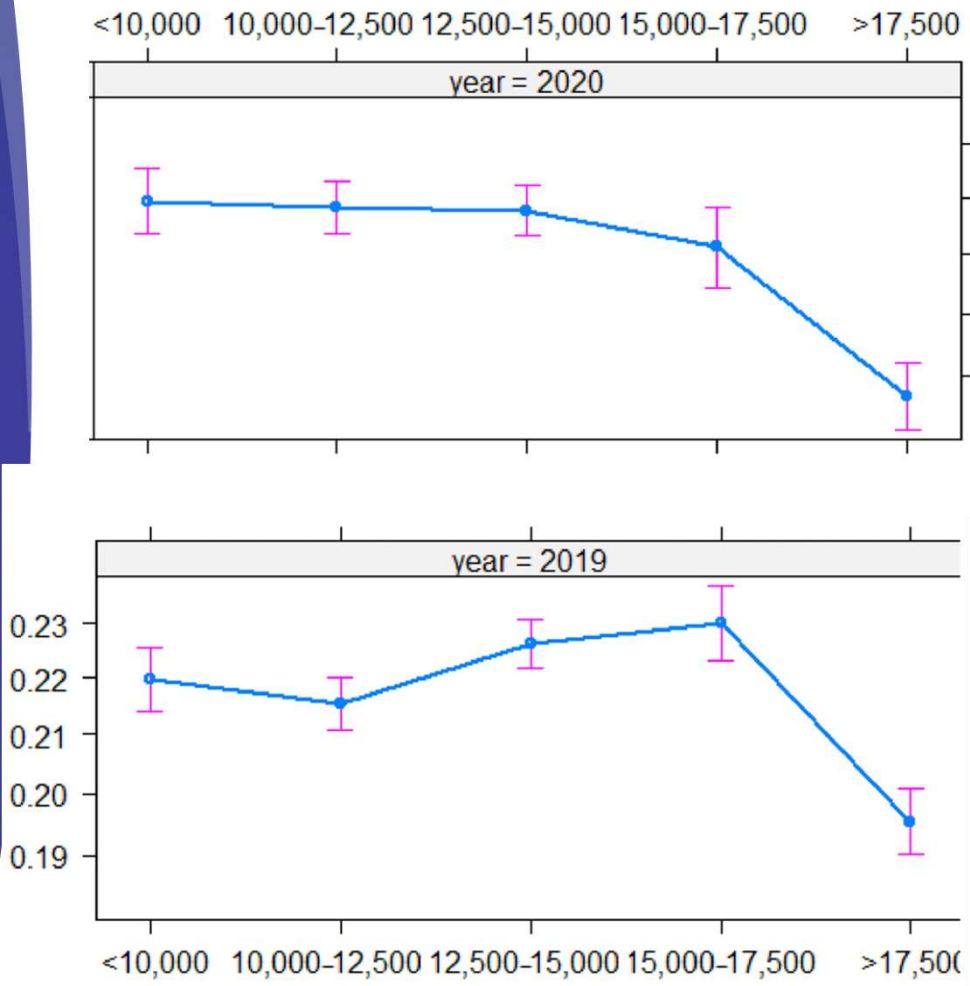

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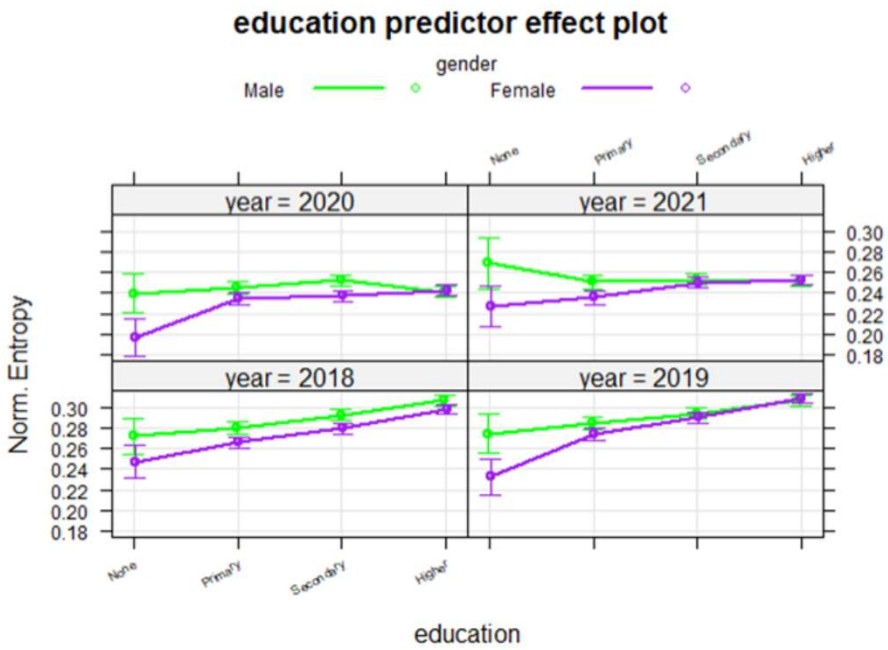

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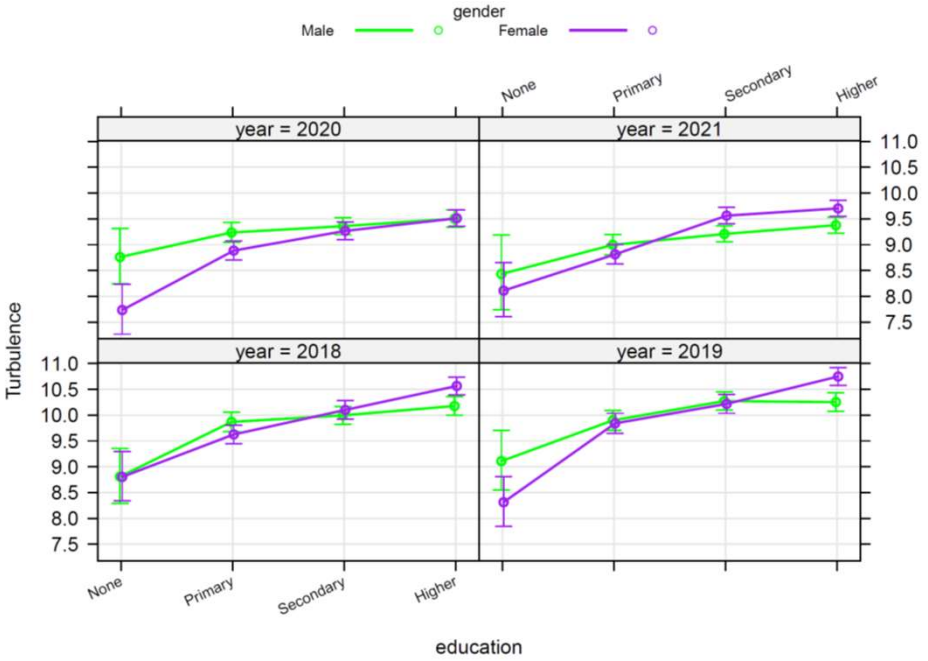

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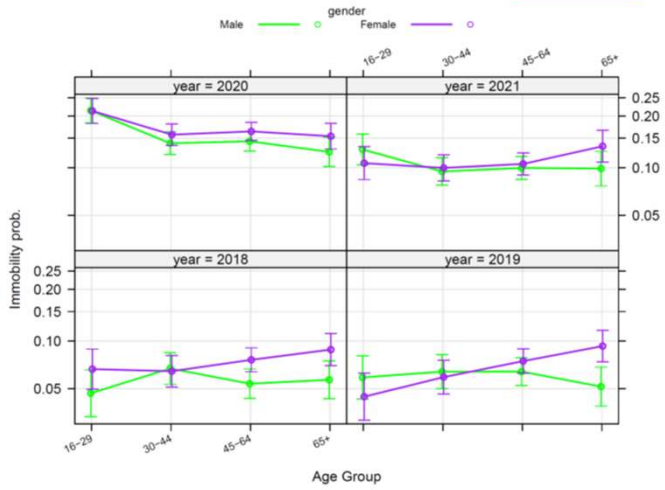

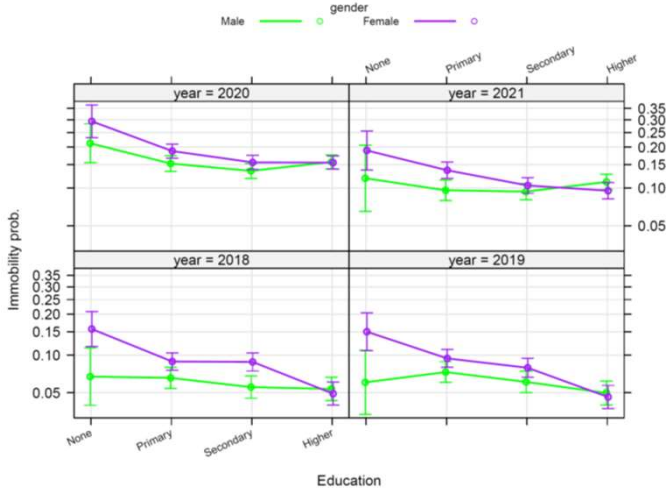

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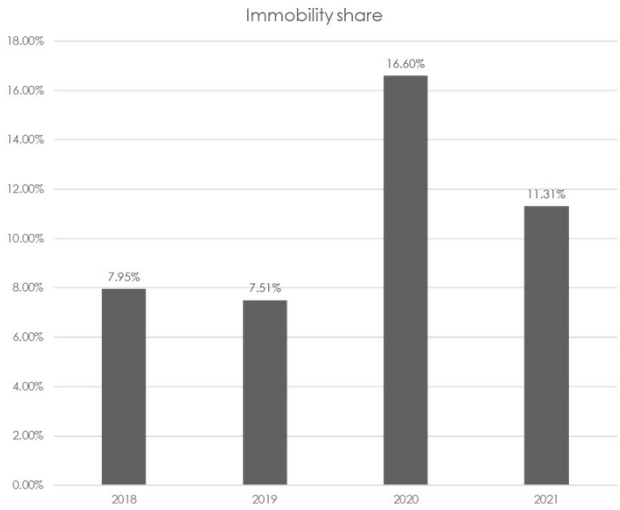
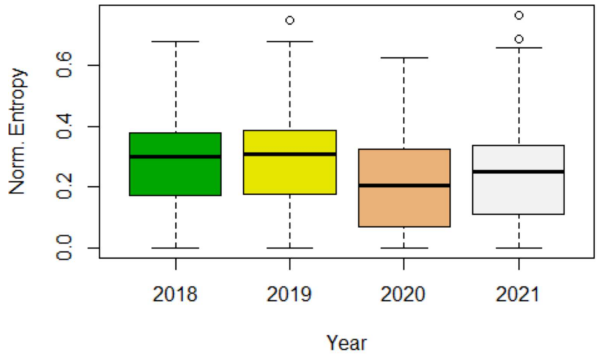




Final discussion

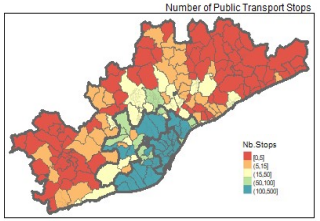
Sustainable mobility practices occur in the inner city, mobility in the outer areas depends on Private Transport.

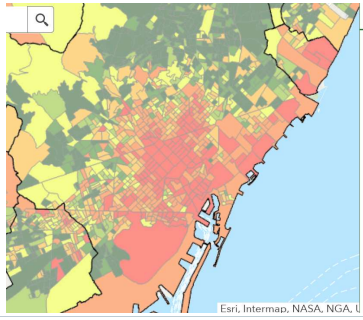
Successful policies such as LEZ/ superblocks reduce car use in the inner city.

Mobility and urban policies through an **intersectional approach**: women, retired, socioeconomic level, **life course**, …

The challenge of sustainable transport in over-touristic destinations should be analysed. The right to the city, the right to housing (SDG 11.1 'access for all to adequate, safe and affordable housing).

Analyses continue (EMEF 2022)



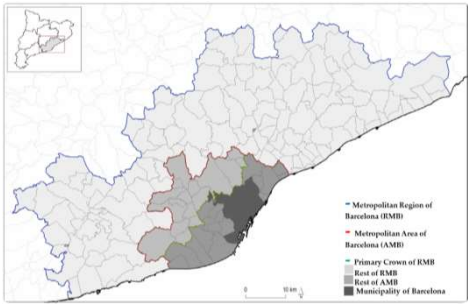


THANKS FOR YOUR ATTENTION!

LUCIA@MEJIA-DORANTES.COM

Barcelona Metropolitan Area (AMB)

- 636 km², 36 municipalities, +3,2 million inhab. in the AMB area. The rest of the RMB area consists of 164 municipalities and 1,848,514 inhabitants
- More than 9 million trips are carried out every day. **Well-scattered public transportation network** with more than 200 bus lines, 4,000 stops, 10 metro lines, 15 railways lines, and two tramway lines.
- **In the inner zone**, the density of streets is high, and public & essential services well-distributed.
- The AMB represents only 2% of the total territory in Catalonia. Here live 43% of the Catalan population.
- The AMB accounts for half of the Cat.´s GDP
- Reported as an Overtouristed city (Peeters, 2018)
- Recent statistics (2021) show that in Catalonia (active) 62% cannot WFH, 23% (WFH-at least partially) could WFH but have not 15% (INE, Online).
- The INE (2021) observed that WFH in 2020 partially or totally increased: **CAT (23.4%)** (ES 17.6%)



Publications

- Montero, L., Mejía-Dorantes, L. & Barceló, J. 2023. The role of life course and gender in mobility patterns: a spatiotemporal sequence analysis in Barcelona. *Eur. Transp. Res. Rev.* 15, 44 https://doi.org/10.1186/s12544-023-00621-1
- Montero, L.; Mejía-Dorantes, L.; Barcelo, J. 2023. Applying data analytics to analyze activity sequences for an assessment of fragmentation in daily travel patterns: a case study of the metropolitan region of Barcelona. "Sustainability (Switzerland)", vol. 15, núm. 19, article 14213.
- Mejía-Dorantes, Lucía, Lídia Montero, and Jaume Barceló. 2021. "Mobility Trends before and after the Pandemic Outbreak: Analyzing the Metropolitan Area of Barcelona through the Lens of Equality and Sustainability" *Sustainability* 13, no. 14: 7908. https://doi.org/10.3390/su13147908
- Mejía-Dorantes, Lucía, Lídia Montero, and Jaume Barceló (Forthcoming) Sustainable Mobility Reframed: Policy Implications Using Activity Fragmentation Indicators of individual mobility sequences in Barcelona Nectar book
- Montero, L., Mejía-Dorantes, L. & Barceló, J. (Forthcoming) The effects of the spatial distribution of activities, their fragmentation, accessibilities, urban structure and gender factor in travel behaviour in the metropolitan region of Barcelona.